REMARKS

The present invention is a method for constructing a reservoir model representative of an underground reservoir, including discretizing said reservoir by a set of grid cells, and associating with said reservoir model a permeability field constrained by *a priori* geologic data and production data or pressure data obtained from well tests collected in the reservoir. The method constructs an initial reservoir model including generating a permeability field in accordance with a stochastic model coherent with the *a priori* geologic data; identifies zones inside the underground reservoir; calculates permeabilities of the zones, uses a simulator to simulate fluid flows for estimating simulated production data or simulated pressure data, and estimates corrections of the permeabilities for reducing a difference between the production data or pressure data obtained from well tests and the simulated production or simulated pressure data; propagates the corrections to the set of grid cells to the reservoir model by an iterative optimization process comprising minimizing a function which depends on the corrections, using a technique of gradual deformation of utilizations of the stochastic model; and uses the reservoir model, including the corrections propagated to the set of grid cells, to develop the underground reservoir.

Claims 27-28, 31-32, 35-36 and 39-40 stand rejected under 35 U.S.C. §103 as being unpatentable over U.S. Published Application 2002/0029882 (Rouffignac et al) in view of U.S. Published Application 2005/0149307 (Gurpinar et al). These grounds of rejection are traversed for the following reasons.

In Section 8.1 of the Office Action, the Examiner concludes as follows:

> Regarding subsection 1 *supra,* Applicants are arguing features which <u>are drawn to intended use and are accordingly not given</u>

patentable weight. Specifically, the emphasized portion is intended use and is not necessitated by claim language, and, in accordance with MPEP 2111.04 is not given patentable weight: "calculating permeabilities of said zones and estimating simulated production data or simulated pressure data by carrying out, by means of a simulator, a simulation of fluid flow, to estimate corrections to be applied to said permeabilities in order to reduce a difference between said production or simulated pressure data". Applicants have admitted that simulation flow is indeed taught by the applied reference.

Claim 27 has been amended to recite, in subparagraph (c) "calculating permeabilities of said zones, using a simulator to simulate fluid flows for estimating simulated production data or simulated pressure data, and estimating corrections of said permeabilities for reducing a difference between said production data or pressure data obtained from well tests and said simulated production data or simulated pressure data. Subparagraph (c) as amended, does not recite intended use limitations and must be given patentable weight since subparagraph (c) contains method steps of "calculating permeabilities..., using a simulator...and estimating correction of said permeabilities...".

The Examiner concludes that Applicants have admitted the simulated flow is indeed taught by the applied reference. This conclusion is traversed insofar as the Examiner is concluding that simulation of flow as claimed is indeed taught by the applied reference. The bottom of page 11 and the top of page 12 of the February 13, 2008 Amendment stated as follows:

> The Examiner contends that step c) of claim 27 is anticipated by paragraphs 112, 521, 739, 874 and 961 of Rouffignac et al. It is submitted that while some of these paragraphs do, in fact, refer to simulation flow, none of the paragraphs anticipate either subparagraph c) prior to amendment or as amended and paragraph d) (emphasis added).
>
> It is submitted that Rouffignac et al in none of the referenced paragraphs discloses "a simulation of fluid flows, to estimate

7

corrections to the applied to said permeabilities in order to reduce a difference between said simulated production data or simulated pressure data obtained from well tests and said simulated production or pressure data." For example, the reference to simulation of H_2 in paragraph [0961] has nothing to do with the foregoing subject matter.

Moreover, since the result of subparagraph c) of claim 27 is to estimate corrections, the claimed propagating of corrections in step d) is also not taught by Rouffignac et al.

As may be seen, instead of admitting that Rouffignac et al disclose the claimed simulation, what was said is that "none of the referenced paragraphs discloses a simulation of fluid flows...."

It is submitted that Rouffignac et al do not teach the subject matter of subparagraph (c) and specifically do not teach a mechanism for estimating corrections of the permeabilities for reducing a difference between the production data or pressure data obtained from well tests and the simulated production or simulated pressure data as recited in claim 27 and further as described in paragraph [0036] of the Substitute Specification. Moreover, the Examiner admits on page 5 of the Office Action that "Rouffinac does not explicitly disclose 'in order to reduce a difference between said production data or pressure data obtained from well tests and said simulated production or simulated pressure data".

However, the Examiner concludes that "Gurpinar however discloses an analogous system having the said feature **(para 33 and 37)**." What Gurpinar discloses in paragraph [0033] is in part "...creating an initial reservoir model in the reservoir simulator, (b1.5) performing a volumes consistent check to determine whether there is consistency in initial volumes and whether the grid system that is superimposed on the rock model is a reliable representation of a property description developed during the geological modeling step (a5), (b1.6) when there is

8

consistency in the initial volumes, generating a corrected volume model,...)". It is submitted that this disclosure is not a disclosure of estimating corrections of said permeabilities for reducing a difference between said production data or pressure data obtained from well tests and said simulator production data or simulated pressure data.

Therefore, if the proposed combination were made, the subject matter of the claimed invention would not be achieved since neither Rouffignac alone or in combination with Gurpinar teaches the subject matter of paragraph (c).

Moreover, the Examiner concludes:

> "[i]t would have been obvious to one of ordinary skill in the art <well engineering / simulation / planning> at the time of Applicant's invention to combine the references in order to predict and have a more precise well reservoir model by correlating and feeding back simulated data with real data; thereby, getting a more accurate model - saving time and money associated with reworking.
> Rouffignac discloses: 28. The method as claimed in claim 27 comprising using said reservoir model to develop an oil reservoir **(38, 987, 19, 584)**."

Rouffignac pertains to treating hydrocarbon containing formations *in situ* with thermal processing and Gurpinar discloses a method of managing a fluid or gas reservoir which simulates diverse data having different acquisition time scales and special scales. The Examiner's above-stated rationale for combining the references does not carry the burden of proof that Gurpinar is an analogous art or furthermore that Gurpinar would be considered by a person of ordinary skill in the art for combination with Rouffignac to achieve the claimed invention without the exercise of hindsight. Accordingly, it is submitted that the rejection of claims 27-28, 31-32, 35-36 and 39-40 as being obvious over Rouffignac in view of Gurpinar is improper and should be withdrawn.

Claims 27-28, 31-32, 35-36 and 39-40 stand rejected under 35 U.S.C. §103 as being unpatentable over United States Patent 6,826,520 (Khan) in view of Rouffignac and in view of Gurpinar. These grounds of rejection are traversed for the following reasons.

The deficiencies of Rouffignac and Gurpinar and the reasons why a person of ordinary skill in the art would not consider their combination have been discussed above and are incorporated herein by reference.

The Examiner states that "Kahn however does not explicitly disclose a permeability field contained by *a priori* geologic data and production data or pressure data obtained from well tests corrected in said underground reservoir and e) using said underground reservoir model, including said correction propagated to said set of grid cells, to develop said underground reservoir. Rouffignac however discloses said features **(para 570, 38, 987)**."

The Examiner concludes that the estimation of corrections to be applied to said permeabilities is disclosed by column 12, lines 42-59, of Kahn. This conclusion is traversed for the following reasons.

The cited portion of Kahn states "the scale-up method can be applied to up-scale permeabilities for an arbitrary number of course-grid connections simultaneously". However, the Examiner has not demonstrated that the "scale-up method" as disclosed in the cited portion of column 12 has any relevance "to estimation of connections to be applied to said permeabilities." It is submitted that the Examiner cannot demonstrate, that Kahn discloses in column 12, lines 42-59, as claimed "estimating corrections of permeabilities for reducing a difference between said production data or pressure data obtained from well tests and said simulated

10

production data or simulated pressure data". Accordingly, if the proposed combination of Kahn, Rouffignac and Gurpinar was made as stated by the Examiner, the claimed subject matter would not be obtained.

Moreover, it is submitted that the Examiner is engaging in hindsight by proposing the combination of Rouffignac, Gurpinar and Kahn. It is submitted that Kahn's method of upscaling permeabilities is not analogous to the subject matter of Rouffignac and Gurpinar and would not be combined to achieve the subject matter of claims 27-28, 31-32, 35-36 and 39-40 except by the exercise of hindsight.

Claims 29-30, 33-34, 37-38 and 41-42 stand rejected under 35 U.S.C. 103 as being unpatentable over Kahn in view of Rouffignac as applied to claim 27 in view of Gurpinar and further in view of United States Patent 6,549,879 (Cullick). It is submitted that Cullick does not cure the deficiencies noted above with respect to the rejection of claims 27-28, 31-32, 35-36 and 39-40 over Rouffignac, Gurpinar and Kahn.

The amendments to subparagraph (c) are made to address the Examiner's contention regarding intended use and do not change the substance of the claims as searched prior to amendment. Accordingly, it is requested that the Examiner consider these amendments on the merits and allow the present application.

Support for the amendment is identical to that of the last Amendment.

In view of the foregoing amendments and remarks, it is submitted that the application is in condition for allowance. Accordingly, early allowance thereof is respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 C.F.R. §1.136. Please charge any shortage in fees due in connection with the

filing of this paper, including extension of time fees, to Deposit Account No. 01-2135

(612.42904X00) and please credit any excess fees to such Deposit Account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

_____/Donald E. Stout/_____

Donald E. Stout
Registration No. 26,422
(703) 312-6600

DES:dlh